

Notice of Allowability

Application No.

10/088,179

Examiner

SOPHIA VLAHOS

Applicant(s)

NOGUCHI ET AL.

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/21/2006.
2. ☒ The allowed claim(s) is/are 1-13.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

DETAILED ACTION

Specification

1. The revised abstract received on 3/21/2006 is accepted.

Reasons for Allowance

2. The following is an examiner's statement of reasons for allowance:

The prior art of the record fails to teach or suggest alone or in combination:

A digital signal encoding apparatus for encoding one-bit signals of a plurality of n channels, the one-bit signals being modulated in the delta-sigma manner, comprising: means for adding information data which is related with the one-bit signals to the phase-modulated one-bit signal data having the data of inverted phases added thereto by rearranging the data of inverted phases based on a plurality of m channel units of the n channels, wherein $n \geq m \geq 2$ and by employing an exclusive OR of the information data and the phase-modulated one-bit signal data, as recited in independent claim 1, and in combination with other elements of the claim.

Claims 1, 3-4 are allowed.

3. The prior art of the record fails to teach or suggest alone or in combination: A digital signal encoding apparatus for encoding one-bit signals of a plurality of n channels, n being equal to at least two, and the one-bit signals being modulated in delta sigma manner, the apparatus comprising: information data adding means for adding

information data that are related to the one-bit signals to the phase-inverted one-bit signal data by rearranging the data of inverted phases, wherein $n \geq m \geq 2$;
synchronization data adding means for adding independent synchronization patterns by converting the data of inverted phases in the region in accordance with the phase-modulated one-bit signal data as recited in independent claim 5, and in combination with other elements of the claim.

Claims 5-6 are allowed.

4. The prior art of the record fails to teach or suggest alone or in combination:
a digital signal encoding method for encoding one-bit signals of a plurality of n channels, n being equal to at least two, and the one-bit signals being modulated in a delta-sigma manner, the method comprising the steps of:
converting the data of inverted phases in the region in accordance with the phase-modulated one-bit signal data; and making numbers of one-bit data 1's and one bit data 0's in the predetermined period that are generated when the synchronization patterns are added by the synchronization signal adding step equal to each other by converting the data of inverted phases in a region of the predetermined period such that the difference between the numbers of 1's and 0's is zero, as recited in independent method claim 7, and in combination with other elements of the claims.

Claims 7-10 are allowed.

5. The prior art of the record fails to teach or suggest alone or in combination: a digital signal decoding apparatus comprising: converting the data of inverted phases in the region in accordance with the phase-modulated one-bit signal data; information data detecting means for detecting the information data by judging insertion positions of the data inverted phases, as recited in independent apparatus claim 11, and in combination with other elements of the claims. Corresponding method claim 12 is allowed for the same reasons.

Claims 11 and 12 are allowed.

6. The prior art of the record fails to teach or suggest alone or in combination: a digital signal decoding apparatus that detects the information data by judging the insertion positions of the data of inverted phases as recited in independent apparatus claim 13, and in combination with other elements of the claim.

Claim 13 is allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ichimura et. al., (U.S. 5,835,042) discloses: a transmission apparatus using a $\Delta\Sigma$ phase modulator outputting signals having inverted phases.

Nuitjen (U.S. 6,507,299) discloses: a $\Delta\Sigma$ modulator that periodically embeds a sync pattern comprising a number of 1's followed by a number of 0's in a signal.

Linnartz et. al., (U.S. 6,574,543) discloses: an apparatus inserting supplemental data at predefined positions of a signal, and a decoding system that searches for the supplemental data.

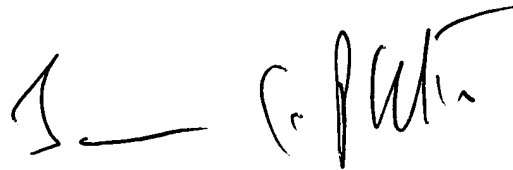
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is 571 272 5507. The examiner can normally be reached on MTWRF 8:30-17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SV
5/5/06

A handwritten signature in black ink, appearing to read "J. K. Patel", is written over a horizontal line.

JAY K. PATEL
SUPERVISORY PATENT EXAMINER